

Conifer-feeding Webspinning Sawflies of the Genus *Acantholyda* (Hymenoptera, Pamphiliidae) from Korea*

Akihiko SHINOHARA¹⁾ and Bong-Kyu BYUN²⁾

¹⁾Department of Zoology, National Science Museum (Nat. Hist.), 3-23-1
Hyakunin-cho, Shinjuku-ku, Tokyo, 169 Japan

²⁾Division of Forest Entomology, Forestry Research Institute, Cheongryangri 2-dong 207,
Dongdaemun-ku, Seoul 130-012, Korea

Abstract Korean species of the conifer-feeding webspinning sawfly genus *Acantholyda* are revised and three species, *A. erythrocephala* (Linnaeus, 1758), *A. posticalis* (Matsumura, 1912) and *A. parki* [= *A. posticalis posticalis* sensu Lee, 1961], are recognized, the last one being described as new. *Acantholyda parki*, a close relative of *A. posticalis*, is a serious pest of *Pinus koraiensis*. The lectotype of *Lyda posticalis* Matsumura, 1912, is designated and redescribed. A key to the three species is given.

Keywords Systematics, revision, Hymenoptera, Pamphiliidae, *Acantholyda*, Korea

INTRODUCTION

Acantholyda A. Costa, 1859, is a Holarctic genus of web-spinning sawflies, represented by nearly 60 species in the world. The adults are easily distinguished from the other pamphiliids by the presence of a preapical spine on the inner side of the fore tibia. The larvae are known to feed on needles of conifers of the genera *Pinus*, *Larix*, *Abies*, *Picea*, *Tsuga* and *Pseudotsuga* and some species are notorious pests. Korean species of *Acantholyda* have been studied by various authors, but there has been some confusion as to their specific identities. In 1927, Takeuchi published a paper on Korean sawflies, in which he gave collection data of *A. erythrocephala* (Linnaeus, 1758) from "Shinshu" [=Chinju, Kyongsangnam-do]; this is the first record of the genus from Korea. In the next year, Saito (1928), dealing with insect pests on *Pinus densiflora* in Suwon, Kyonggi-do, reported on two pamphiliid sawflies under the name of "Matsu-no-kubiaka-ruri-habachi *Lyda erythrocephala* L." and "Matsu-no-itokake-habachi *Lyda* sp.", respectively. Takeuchi (1930, 1938) listed *A. erythrocephala* and *A. sasakii* (Yano, 1916) as occurring in Korea; *A. sasakii* is the valid scientific name for the species known in Japanese as "Matsu-no-itokake-habachi". Saito (1931, 1941) also treated these two species, the latter species under the same Japanese

* This work is supported in part by the Grant-in-aid for Scientific Research No. 07640943 from the Ministry of Education, Science, Sports and Culture, Japan.

name as in his 1928 paper but with different scientific names, "*Lyda stellata* Chr." (1931) and "*Acantholyda sasakii* Yano" (1941), respectively. Following a mass-occurrence of a pamphiliid sawfly causing serious damages to *Pinus koraiensis*, Lee and Cho (1959) and Lee (1961, 1962, 1963) made a detailed study on the pest. The pamphiliid was first determined as "*Acantholyda stellata* Christ" by Lee and Cho (1959), but later "*Acantholyda posticalis posticalis* Matsumura" was used by Lee (1961, 1962, 1963). Occasional outbreaks of this species and resulting damages of *Pinus koraiensis* still occur today (Chung & Shin, 1985, 1986, 1994 a, 1994 b).

More recent handbooks or checklists (Kim, 1963, 1970; Ko, 1969; Korean Society of Plant Protection, 1972; Kim et al., 1994) are all based on the information originally published in the works reviewed above*. Ko (1969) and the Korean Society of Plant Protection (1972) listed *A. nipponica* Yano et Sato, 1928, as occurring in Korea, without any collection data. This is certainly an erroneous record based on confusion with the closely related *A. erythrocephala*. The latest checklist of Korean insects (Kim et al., 1994) included three species of *Acantholyda*: "*A. erythrocephala* Linné", "*A. nemoralis* Thomson" [= *A. posticalis* (Matsumura, 1912)], and "*A. sasakii* (Yano)". Shinohara (1995) recently pointed out that Saito's (1928, 1931, 1941) records of "Matsu-no-itokake-habachi", for which three different scientific names were applied, and all the subsequent Korean records of *A. sasakii* apparently based on them (Takeuchi, 1930, 1938; Kim, 1963, 1970; Ko, 1969; Korean Society of Plant Protection, 1972; Kim et al., 1994) should actually refer to *A. posticalis* (Matsumura, 1912), and *A. sasakii* should be excluded from the Korean fauna.

Recent mass-occurrence of an *Acantholyda* species defoliating *Pinus koraiensis* has necessitated correct identification of the species. In this work, we have revised the Korean species of the genus and recognized three species, *A. erythrocephala* (Linnaeus, 1758), *A. posticalis* (Matsumura, 1912) [= *Lyda* sp. of Saito, 1928; *Lyda stellata* sensu Saito, 1931; *Acantholyda sasakii* sensu Saito, 1941] and *A. parki* [= *A. posticalis posticalis* sensu Lee, 1961], the last species, a destructive pest on *Pinus koraiensis*, being described as new.

We wish to thank Prof. M. Ishii, University of Osaka Prefecture, Sakai (UOP), Prof. K.T. Park, Kangwon National University, Chuncheon (KNU), Prof. B. J. Rho and Dr. J.I. Song, Natural History Museum, Ewha Woman's University, Seoul (EWU), Prof. M. Suwa, Hokkaido University, Sapporo, and Prof. K.-S. Woo and Mr. J.-W. Kim, Seoul National University, Suwon (SNU), for allowing study material under their charge, and Dr. D.R. Smith, United States Department of Agriculture, Washington, D.C., and Dr. K. Maeto, Forest Research Institute, Kukizaki, for their help regarding the literature. Many thanks are also due to Dr. S.-I. Uéno, National Science Museum (Nat. Hist.), Tokyo (NSMT), for his reviewing this manuscript and Drs. S.B. Chung and S.C. Shin, Forestry Research Institute, Seoul (FRIS), for their constant guidance.

* Kim (1963) used the Japanese name "matsunoitogakehabachi" for "*A. nemoralis*" (= *A. posticalis*) and treated *A. sasakii* separately without a Japanese name. "Matsu-no-itokake-habachi" is, however, the Japanese name for *A. sasakii* and "Atoguro-hirata-habachi" is *A. posticalis* in Japanese.

***Acantholyda erythrocephala* (Linnaeus, 1758)**

Tenthredo erythrocephala Linnaeus, 1758, p. 558.

Acantholyda erythrocephala: Takeuchi, 1927, p. 380; Takeuchi, 1930, p. 3; Takeuchi, 1938, p. 207; Saito, 1941, p. 129; Kim, 1963, p. 278; Kim, 1970, p. 124, 715; Ko, 1969, p. 303; Kim et al., 1994, p. 216.

Lyda erythrocephala: Gussakovskij, 1935, p. 139, 140, 366; Saito, 1928, p. 10; Saito, 1931, p. 36.

Acantholyda nipponica: Ko, 1969, p. 303; Korean Society of Plant Protection, 1972, p. 210. [Partim; nec Yano & Sato, 1928.]

Distribution. Korea; Siberia; Europe; N. America [introduced].

Korean material examined. 1 ♀, "11. IV. 1926, Chinju [in Chinese characters], Hasegawa" "*Acantholyda erythrocephala* (L.), det. Takeuchi" (UOP); 2 ♀, "Suigen [=Suwon], 20-V, 1931, Coll. K. Sato" (NSMT); 1 ♀, same data except "May 1, 1925" (NSMT); 1 ♀, same data except "Apr. 16, 1924" (NSMT); 1 ♀, same data except "IV-23-1938" (NSMT); 2 ♀, same locality (NSMT); 1 ♀, "1967. 10. 15, Suwon, Chang Won-Kyong" (EWU); 1 ♀, "Suwon, 21. IV. 1990, S. M. Jang" (SNU); 1 ♀, "Suwon, 15. V. 62, Paik" (SNU); 1 ♀, "Suwon, June" (SNU); 2 ♀, "Yangji, 15. IV. 57, Lee" (SNU); 1 ♀, "Torai, 2-V-1931, H. Sugiura" (NSMT); 1 ♀, "Taikyu [=Taegu], 5-V-1931, H. Sugiura" (NSMT); 1 ♂, "Chuncheon, 4. V. 1985, S. K. A." (KNU); 1 ♀, "Corea" (NSMT).

Host-plants. *Pinus resinosa*, *P. strobus*, *P. mughus*, *P. montana*, *P. sylvestris*, *P. densiflora*, *P. austriaca*, *P. pungens*, *P. nigra* (Middlekauff, 1958).

Remarks. The female of this conspicuous species is easily distinguished from the other Korean pamphiliids by its reddish brown head, weakly metallic bluish black thorax and abdomen, and uniformly blackish wings. The male is similar to the female in coloration but the head is largely bluish black. *Acantholyda erythrocephala* closely resembles the Japanese endemic species *A. nipponica*, which was first recorded from Japan as *A. erythrocephala* by Takeuchi (1923). However, *A. erythrocephala* differs from *A. nipponica* in the uniformly infuscated wings (the apical half distinctly less infuscated than the basal half in *A. nipponica*), usually largely reddish brown mandibles in the female (mostly black in *A. nipponica*), pale brown anterior tibia and tarsus in the female (blackish brown in *A. nipponica*), blackish brown to black mid and hind tibiae and tarsi in the male (pale brown in *A. nipponica*), and rather uniformly finely striated, sparsely punctured abdominal sterna in the female (posterior margin distinctly smoother and with denser punctures than the other part of the sternum in *A. nipponica*). The record of *A. nipponica* from Korea by Ko (1969) and Korean Society of Plant Protection (1972) is probably erroneous, presumably based on the confusion of *A. erythrocephala* and *A. nipponica* in old literature (Takeuchi, 1923, 1927; Yano & Sato, 1928).

***Acantholyda parki* sp. nov.**

(Figs 1, 3, 4, 6, 9-11)

Acantholyda stellata: Lee & Cho, 1959, p.96. [Nec Christ, 1791.]

Acantholyda sasakii: Paik, 1960. [Nec Yano, 1916.] (Not seen in original)

Acantholyda posticalis posticalis: Lee, 1961, p. 1; Lee, 1962, p.21; Lee, 1963, p.21; Ko, 1969, p.303.

[Nec Matsumura, 1912.]

Acantholyda nemoralis: Kim, 1963, p.277; Kim, 1970, p.123, 715; Kim et al., 1994, p.216. [*Partim*; nec Linnaeus, 1758; erroneously attributed to Thomson, 1871.]

Female (holotype). Length about 13.5 mm. Forewing length about 12.5 mm. Head black, with pale sordid yellow marking as in Fig. 1; gena and malar space mostly pale sordid yellow; mandible pale sordid yellow, becoming blackish ferruginous towards apex; antenna pale brown, with scape, except radicle and both apices of main body, black. Thorax black, with the following parts pale sordid yellow: broad posterior margin and most of lateral part of pronotum, most of cervical sclerite, large circular marking on mesonotum represented by paired triangular spots on mesoscutal median lobe, anteromedially constricted marking on each mesoscutal lateral lobe and spot covering most of mesoscutellum, most of mesoanepisternum, narrow posterior margin of mesepimeron, metascutellum, most of metepisternum, and large spot on metepimeron. Legs pale brown, with narrow base and dorsal (posterior) surface of each coxa, and dorsal (posterior) surface of each trochanter and femur (except at apex of each) black. Wings hyaline, stained with pale brown; stigma and veins pale brown, with crossvein 1r somewhat blackish. Abdomen (Fig. 6) pale brown, with propodeum (except posterior $1/2 \sim 1/3$), narrow anterior margin of 2nd tergum, narrow anterior margin of 2nd sternum, and mediobasal part and medioapical depressed area of 7th sternum black. Head with postgenal carina very distinct; vertex (postocellar area) about 0.95 times as long as anteriorly wide; lateral sutures distinctly divergent forwards, anterior parts obsolete; transverse suture shallow but distinct laterally and becoming indistinct medially; lateral transverse suture absent; coronal suture distinct, entire, running with slightly depressed line dividing postocellar area medially; frons weakly raised; ocellar basin small and shallow; median fovea elongate, rather shallow; frontal tubercle rather low but recognizable between antennae; facial crest weakly raised, very bluntly carinate; clypeal crest low, roof-like with rounded top, lower than frontal tubercle in lateral view. Head behind level of transverse and lateral transverse sutures and upper part of gena smooth, with very broadly spaced, small to medium-sized, distinct punctures; area from level of lateral transverse suture to facial crest and frons with denser, partly confluent punctures; paraantennal field smooth, with dorsal $1/3$ slightly roughened, with several, rather inconspicuous punctures; clypeus rather smooth, with broadly spaced, small to medium-sized punctures, dorsolateral parts very shallowly transversely rugose; lower part of gena rugose, with coarse irregular punctures. Punctures on head bearing very short, inconspicuous, pale-colored hairs. Both antennae 34-segmented, with 3rd segment about 2.1 times as long as 4th. Forewing with cell C glabrous and stub of m+cu-a absent; hindwing with apical stub of 2A absent. Abdominal segments coriaceous, giving dull luster.

Male (a paratype from Honcheon). Length about 12 mm. Forewing length about 9.5 mm. Head black, with pale sordid yellow marking as in Fig. 3; gena and malar space pale sordid yellow; mandible pale sordid yellow, becoming blackish ferruginous towards apex; antenna pale brown, becoming darker towards apex, with large dorsal spot on scape black. Thorax black, with the following parts pale sordid yellow: broad posterior margin and most of lateral part of pronotum, most of cervical sclerite, large circular marking on mesonotum represented by paired triangular spots on mesoscutal median lobe, anteromedially constricted (nearly disconnected) marking on each mesoscutal lateral lobe and spot

covering most of mesoscutellum, most of mesepisternum (anepisternum + preepisternum, Fig. 4), narrow posterior margin of mesepimeron, metascutellum, most of metepisternum, and large spot on metepimeron. Legs pale brown, with narrow base of each coxa, and dorsal (posterior) surface of each trochanter (except at apex of each) black; fore and mid femora each with large black spot on dorsal (posterior) surface; hind femur with a row of irregular fading small black spots on dorsal (posterior) surface. Wings hyaline, stained with pale brown; stigma and veins C and Sc pale brown, other veins and base and anterior margin of stigma dark brown. Abdomen pale brown, with propodeum (except very narrow lateral margins), 2nd to 4th terga (except broad lateral margins), anterior margin and obscure median spot on each of 5th to 7th terga, and very narrow anterior margin of 2nd sternum black. Head with postgenal carina very distinct; vertex (postocellar area) about 0.90 times as long as anteriorly wide; lateral sutures distinctly divergent forwards, anterior parts obsolete; transverse suture shallow but distinct laterally and becoming indistinct medially; lateral transverse suture absent; coronal suture distinct, entire; frons very weakly raised; ocellar basin small and very shallow; median fovea elongate, rather shallow; frontal tubercle low but recognizable between antennae; facial crest weakly raised, very bluntly carinate; clypeal crest low, roof-like with rounded top, about as high as frontal tubercle in lateral view. Head behind level of transverse and lateral transverse sutures and upper part of gena smooth, with broadly spaced, medium-sized, distinct punctures; area from level of lateral transverse suture to facial crest and frons with denser, partly confluent punctures; paraantennal field smooth, with dorsal 1/3 somewhat roughened, with several, rather inconspicuous punctures; clypeus rather smooth, with broadly spaced, small to medium-sized punctures, lateral parts shallowly transversely rugose; lower part of gena rugose, with coarse irregular punctures. Punctures on head bearing pale-colored hairs, those on upper frons about as long as diameter of median ocellus. Left antenna with 32 segments and right one 33, with 3rd segment about 2.0 times as long as 4th. Forewing with cell C glabrous and stub of m+cu-a absent; hindwing with apical stub of 2A absent. Abdominal segments coriaceous, giving dull luster. Subgenital plate with posterior margin narrowly truncate; genitalia as in Figs 9-11.

Distribution. Korea.

Holotype: ♀, "Hong-Cheon, 26. Jul. 1984, K. J. Won". In Forest Research Institute, Seoul (FRIS).

Paratypes: 2 ♀, 3 ♂, same data as for holotype (FRIS); 9 ♀, 23 ♂, "Hongcheon Exp. Forest, 23. VII. 1986, K. T. Park" (KNU, NSMT); 1 ♀ [reared specimen], "Chuncheon, 29. IV. 1984, K. T. Park" (NSMT); 1 ♂ [reared specimen], "Chuncheon, 23. IV. 1984, K. T. Park" (NSMT); 1 ♀, "Chuncheon, 31. V. 1984, Y. J. Kim" (NSMT); 1 ♀, "Chuncheon, 6. 25. 1990, G. S. Na et Y. T. Cheon" (KNU); 1 ♀, 1 ♂, "Korea: Kwang-Nung. Lee Duksang. Larva on *Pinus koraiensis* Sieb. & Zucc., adult 21 VII. 1960" (NSMT); 5 ♀, 1 ♂, "Kyonggi, Kwangju, Chungbu Experimental Forest, VII. 15. 1989, After 3 days of treatment" (SNU); 5 ♀, "Chun-Seong, 25. Jul. 1984, K. J. Won" (FRIS); 1 ♂, "Ga-Pyeong, 20. Jul. 1984, S. B. Jeong" (FRIS).

Variation. Female: The length varies from 12.5 to 15 mm. Thirty-two intact antennae belonging to 20 individuals have 31 (2 antennae), 32 (4), 33 (4), 34 (10), 35 (5), 36 (6) and 37 (1) segments, the 3rd segment about 1.8 to 2.2 times (2.1 in 12 out of 20 individuals examined) as long as the 4th. The large pale marking on the mesonotal lateral lobe is sometimes divided into anterior and posterior spots, but the one on the mesepisternum is never divided into two spots, always covering almost entire

mesoanepisternum. Each abdominal tergum sometimes has the anterior margin (except lateral parts) very narrowly and obscurely lined with black. Male: The length ranges from 10.5 to 12 mm. Thirty-seven intact antennae belonging to 26 individuals have 27 (1 antenna), 30 (2), 31 (10), 32 (5), 33 (8), 34 (9) and 35 (2) segments, the 3rd segment about 1.9 to 2.2 times as long as the 4th. The borders between the mesoanepisternum and mesopreepisternum are sometimes very obscurely marked with black. The 3rd and succeeding abdominal terga are usually mostly pale brown, but sometimes they are largely marked with black, and in the darkest specimen, they are all black except for broad lateral margins and most of 8th tergum.

Host-plant. Five-needle pine, *Pinus koraiensis* Sieb. & Zucc.

Etymology. This new species is named in honor of Prof. K. T. Park, Kangwon National University, Chuncheon.

Remarks. This species is very similar to *A. posticalis* (Matsumura), which was described from Japan and has a wide distributional range from Europe to Japan. The two species can be distinguished by the characters given in the key below, though very pale female specimens of *A. posticalis* are not easily separable from *A. parki*.

As a serious pest on *Pinus koraiensis*, Lee and Cho (1959), Lee (1961, 1962, 1963) and Chung and Shin (1985, 1986, 1994 a, 1994 b) studied the biology of *A. parki* in detail under the names of "*Acantholyda stellata* Christ" (Lee & Cho, 1959) and "*Acantholyda posticalis posticalis* Matsumura" (Lee, 1961, and all the subsequent papers cited above). Lee (1961), presumably following Benson (pers. comm.), recognized two subspecies in *A. posticalis*, i.e., the East Asian "*A. posticalis posticalis* Matsumura" and the European "*A. posticalis pinivora* Enslin", and identified the Korean species with "*A. posticalis posticalis* Matsumura". However, the diagnostic characters given for "*A. posticalis posticalis*" by Lee (1961) do not agree with the nominotypical Japanese specimens of *A. posticalis*, which, on the other hand, may agree better with Lee's diagnosis for "*A. posticalis pinivora*". A comparison of Japanese, Korean and European specimens of *A. posticalis* has revealed no significant differences, though the East Asian specimens tend to be paler in the abdominal coloration than the European. We have concluded that Lee's "*A. posticalis pinivora*" is *A. posticalis*. Lee's "*A. posticalis posticalis*", now recognized as *A. parki*, differs from *A. posticalis* not only in a few inconspicuous morphological features (see the key below) but also in host preference. Lee's (1962) experiment ascertained that the larvae of *A. parki* feed only on a five-needle pine, *P. koraiensis*, never on two-needle pines. So far as is known, *A. posticalis* feeds only on two-needle pines (for details, see "Host-plants" section under *A. posticalis*).

***Acantholyda posticalis* (Matsumura, 1912)**

(Figs 2, 5, 7, 8)

Tenthredo stellata Christ, 1791, p. 457. [Nec Fourcroy, 1785.]

Tenthredo pratensis Fabricius, 1793, p. 122. [Nec Linnaeus, 1758.]

Lyda nemoralis: Thomson, 1871, p. 301; Gussakovskij, 1935, p. 140, 143, 366, 367.

[Nec Linnaeus, 1758; erroneously attributed to Thomson, 1871.]

Lyda posticalis Matsumura, 1912, p. 76; Takeuchi, 1930, p. 4 [syn. of *pinivora* Enslin].

Acantholyda pinivora Enslin, 1917, p. 678; Takeuchi, 1930, p. 4. [N. n. for *T. stellata* Christ and *T. pratensis* Fabricius.]

Acantholyda posticalis: Takeuchi, 1923, p. 362; Takeuchi, 1930, p. 4 [syn. of *pinivora* Enslin].

Lyda sp.: Saito, 1928, p. 10.

Acantholyda sasakii: Takeuchi, 1930, p. 4; Takeuchi, 1938, p. 207; Saito, 1941, p. 129; Kim, 1963, p. 278; Kim, 1970, p. 124, 715; Ko, 1969, p. 303; Kim et al., 1994, p. 216; Shinohara, 1995, p. 166. [Partim; nec Yano, 1916.]

Lyda stellata: Saito, 1931, p. 36.

Acantholyda nemoralis: Takeuchi, 1938, p. 207; Kim, 1963, p. 277; Kim, 1970, p. 123, 715; Kim et al., 1994, p. 216. [Partim; nec Linnaeus, 1758; erroneously attributed to Thomson, 1871.]

Acantholyda posticalis pinivora: Lee, 1961, p. 1.

Female (Lectotype). Length about 13 mm. Forewing length about 12 mm. Head black, with pale sordid yellow marking as in Fig. 2; gena and malar space mostly pale sordid yellow; mandible pale sordid yellow, becoming blackish ferruginous towards apex. Thorax black, with the following parts pale sordid yellow: broad posterior margin and most of lateral part of pronotum, ventral surface of cervical sclerite, paired triangular spots on mesoscutal median lobe, anterior and posterior triangular spots on each mesoscutal lateral lobe and paired spots on mesoscutellum, most of mesoanepisternum, very narrow posterior margin of mesepimeron, metascutellum, most of metepisternum, and large spot on metepimeron. Legs pale brown, with narrow base and dorsal (posterior) surface of each coxa, and dorsal (posterior) surface of each trochanter and femur (except at extreme apex of each) black. Wings hyaline, stained with pale brown; stigma and veins pale brown, with base of stigma, crossvein 1r, apical part of vein R, and R1 somewhat blackish. Abdomen (Fig. 7) pale brown, with propodeum, 2nd tergum (except lateral margins), narrow anterior margin of each tergum medially, narrow anterior margin of each sternum, and mediobasal part and medioapical depressed area of 7th sternum black. Head with postgenal carina very distinct; vertex (postocellar area) about 0.97 times as long as anteriorly wide; lateral sutures distinctly divergent forwards; transverse suture shallow but distinct laterally and indistinct medially; lateral transverse suture indistinct; coronal suture indistinct; frons very weakly raised; ocellar basin small and moderately deep; median fovea elongate, rather shallow; frontal tubercle rather low but recognizable between antennae; facial crest weakly raised, very bluntly carinate; clypeal crest low, rounded, lower than frontal tubercle in lateral view. Head behind level of transverse and lateral transverse sutures and upper part of gena rather smooth, with rather narrowly spaced, usually medium-sized, distinct punctures; area from level of lateral transverse suture to facial crest and frons with denser, partly confluent punctures; paraantennal field smooth, without distinct punctures; clypeus rather smooth, with rather narrowly spaced, small to medium-sized punctures, dorsolateral parts weakly transversely rugose; lower part of gena rugose, with coarse irregular punctures. Punctures on head bearing short pale-colored hairs. Forewing with cell C glabrous and stub of m+cu-a absent; hindwing with apical stub of 2A absent. Abdominal segments shallowly coriaceous, shining.

Distribution. Japan, Korea, Siberia, Europe.

Lectotype (herewith designated): ♀, "Japan, Matsumura 15/VI 1906 Tokyo", "25", "*Lyda posticalis* Mats. det. Matsumura", "Type Matsumura", "Lectotype, *Lyda posticalis* Matsumura, 1912, Det. A. Shinohara, 1996". In Hokkaido University, Sapporo. It has both the antennae, apex of left mid tarsus

and most of left forewing missing.

Korean material examined. 3 ♂, "Suigen [=Suwon], Apr. 15, 1924, K. Sato" (NSMT); 1 ♀, same data, except for "Apr. 16, 1924" (NSMT); 2 ♂, same data, except for "Apr. 17, 1924" (NSMT); 1 ♀, 1 ♂, same data, except for "Apr. 29, 1925" (NSMT); 1 ♀, 1 ♂, same data, except for "Apr. 18, 1927" (NSMT); 1 ♀, 1 ♂, same data, except for "Apr. 25, 1927" (NSMT); 1 ♂, same data, except for "Apr. 29, 1927" (NSMT); 9 ♀, 1 ♂, same data, except for "V-3-1931" (NSMT); 6 ♀, 1 ♂, same data, except for "V-5-1931" (NSMT); 13 ♀, same data, except for "V-8-1931" (NSMT); 1 ♀, same data, except for "V-15-1931" (NSMT); 1 ♀, same data, except for "V-20-1931" (NSMT); 2 ♀, same data, except for "IV-19-1938" (NSMT); 2 ♀, same locality, "K. Sato" (NSMT); 1 ♀, same locality, "H. Takahashi" (NSMT); 1 ♀, 1 ♂, same locality, "9. IV. 60, Paik" (SNU); 1 ♀, 1 ♂, same locality, "19. IV. 60, Paik" (SNU); 1 ♀, same locality, "4. V. 61, Paik" (SNU); 1 ♂, same locality, "28. VII. 57, Lee" (SNU); 1 ♂, "Kapyong, Sangri, 2. V. 1996, B. K. Byun" (FRIS); 1 ♀, "Huibang-sa, 750 m, Mt. Sobaek-san, Kyongsangbuk-do, 19. V. 1987, A. Shinohara" (NSMT); 1 ♂, same data, except for "20. V. 1987" (NSMT).

Host-plants. Two-needle pines: *P. densiflora* ? in Japan and Korea (Saito, 1928; Okutani, 1967); *P. sylvestris*, *P. nigra* and *P. pumilio* in Europe and Siberia (Berland, 1949; Roberti, 1951; Kolomyietz, 1967); *P. tabulaeformis*, *P. densiflora*, *P. sylvestris* var. *mongolica* in China (Xiao et al., 1991).

Remarks. As shown in the synonymic list above, various scientific names have been applied to this species. It was described from Europe as "*Tenthredo stellata*" by Christ (1791) and as "*Tenthredo pratensis*" by Fabricius (1793), but they are primary junior homonyms of *Tenthredo stellata* Fourcroy, 1785, and *Tenthredo pratensis* Linnaeus, 1758, respectively. Thomson (1871) gave a description of this species under the name of *Lyda nemoralis* (Linnaeus, 1758). Matsumura (1912) described *Lyda posticalis* from Japan. *Acantholyda pinivora* was proposed by Enslin (1917) as a replacement name for "*Tenthredo stellata* Christ 1791 nec Geoffr.[sic] 1785, *T. pratensis* F. 1793 nec L. 1758, *Lyda nemoralis* C.G. Thoms. nec L. 1757" (p. 678). Gussakovskij (1935) erroneously took Thomson's (1871) description as a proposal of a new taxon and called the species "*Lyda nemoralis* Thomson, 1871". This misuse was followed by various authors including Klima (1937), Takeuchi (1938) and Berland (1949), who used the name "*Acantholyda nemoralis* (Thomson, 1871)". Benson (1951), without discussion but quite correctly, called the species *Acantholyda posticalis* (Matsumura, 1912).

When describing *Lyda posticalis*, Matsumura (1912) neither designated the holotype nor gave the number of specimens in the type series. In Matsumura's collection, now housed in Hokkaido University, Sapporo, Shinohara was able to find only one female specimen of this species, which is hereby designated as the lectotype. A redescription of the lectotype is given above, since the original description of *L. posticalis* is inaccurate in some aspects, and the description in Japanese does not partly agree with the English version on the same page. The statement on the coloration of the abdomen is particularly misleading. Matsumura simply noted that the "abdomen and legs fulvous", but the lectotype has the entire propodeum, 2nd tergum except for lateral margins, and median part of each of the succeeding segments basally blackish.

Acantholyda posticalis is a well-known pest of two-needle pines particularly in the western Palearctic.

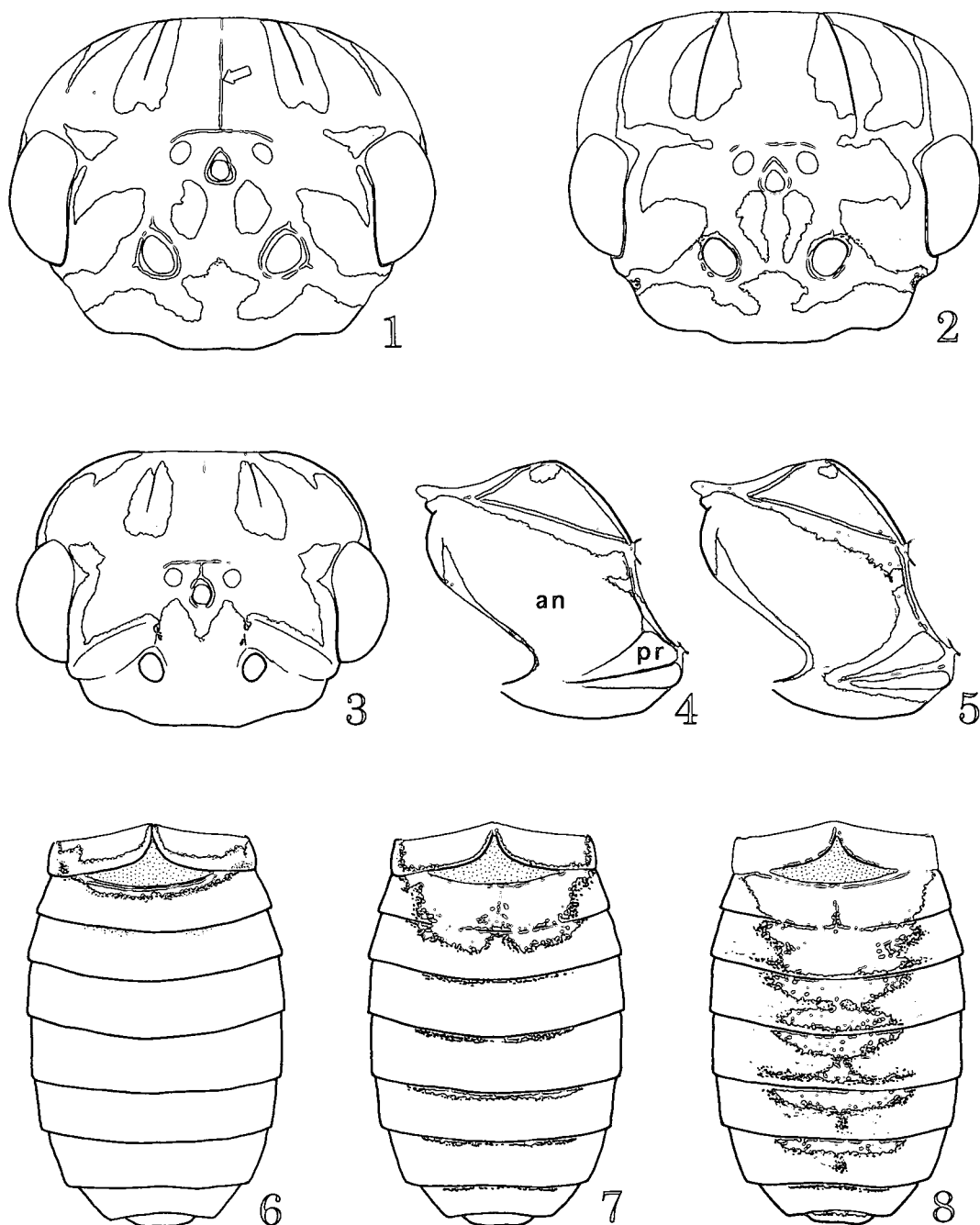
Biology of this species was studied by various authors, including Hardtl (1943), Roberti (1951), Koehler (1957) and Kolomyietz (1967) (see also Klima, 1937, for further references).

After studying Polish populations of this species, Koehler (1954, 1957) recognized two allopatric "forms," i.e. "*A. nemoralis* f. *occidentalis*" and "*A. nemoralis* f. *orientalis*," based on the coloration of the cervical sclerite and mandible of the adult female, coloration of the larva, and some ecological features including timing of the occurrence of the adults. Under the ICZN, these names are available and should be treated as subspecies. Koehler (1962) renamed these as "*A. nemoralis* f. *serotina*" and "*A. nemoralis* f. *praecox*," respectively, but these names, originally proposed as synonyms, are not available under the ICZN. Koehler (1964) gave a table comparing the three "forms" of this species, "f. *praecox*," "f. *serotina*," and "f. *typica*." The biological significance and validity of Koehler's subspecies are not quite clear.

With the exception of one male specimen as noted below, the Korean specimens examined may fit Koehler's *orientalis*, because they all were collected in April or May and the cervical sclerite and the female mandible are black-marked, though the black marks are obsolete or missing in a few specimens. One male from Suwon was collected in late July and has no black marking on the cervical sclerite ventrally, thus agreeing with *occidentalis*. This may suggest the occurrence of the spring and summer "forms" in Korea but naturally they can not belong to separate subspecies, since they are sympatric in distribution.

Key to the Korean Species of *Acantholyda*

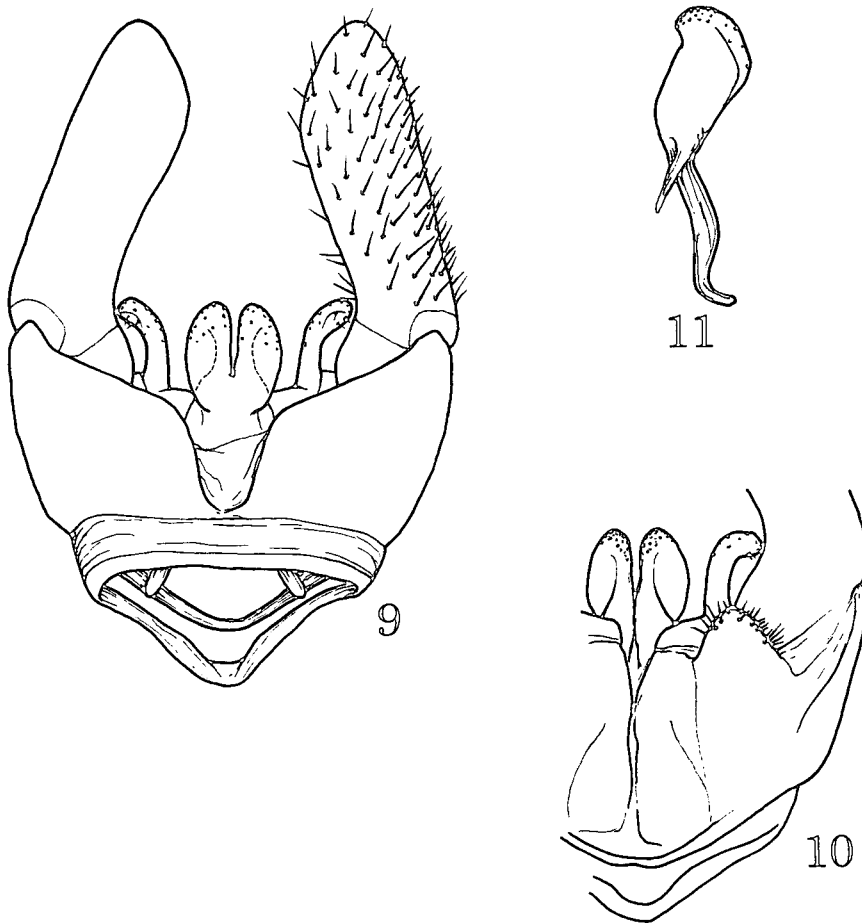
1. Postgenal carina obsolete. Female: Head reddish brown and thorax and abdomen weakly metallic bluish black. Male: Entire body weakly metallic bluish black or blackish, with only ventral half of face and apical half of fore leg pale yellowish. *A. erythrocephala*
- Postgenal carina well developed. Female and male: Body black, richly marked with pale brown and pale sordid yellow. 2
2. Female: Coronal suture distinct, entire, running with slightly depressed line dividing postocellar area medially (Fig. 1); vein R and R1 of forewing usually pale brown, nearly concolorous with or slightly darker than vein C; abdomen entirely pale yellowish brown dorsally, except for blackish propodeum and, sometimes, very narrow blackish anterior margin of each tergum (Fig. 6). Male: Coronal suture usually distinct; paraantennal field ventrally smooth and impunctate and dorsally somewhat roughened, sparsely punctate and pilose; facial crest usually inconspicuous; postgena largely pale-marked; pale marking on mesonotal lateral lobe and mesoscutellum well developed; mesepi-sternum (preepisternum+anepisternum) entirely or almost entirely pale sordid yellow (Fig. 4); hind femur mostly pale above, with only obscure black marking. Larva feeding on a five-needle pine, *Pinus koraiensis*. *A. parki*
- Female: Coronal suture usually indistinct; postocellar area not depressed along median line; vein R and R1 of forewing usually blackish brown, distinctly darker than vein C; abdomen largely blackish dorsally, at least propodeum and most of 2nd tergum and median parts of other terga basally blackish (Figs 7, 8). Male: Coronal suture usually indistinct or absent; paraantennal field usually very smooth and



Figs 1-8. Color patterns of *Acantholyda* spp. 1, *A. parki* n. sp., female, holotype, head, dorsofrontal view (coronal suture indicated by an arrow); 2, *A. posticalis* (Matsumura), female, lectotype, head, dorsofrontal view; 3, *A. parki*, male, paratopotype, head, dorsofrontal view; 4, *A. parki*, male, paratopotype, mesopleura, left side, ventrolateral view (an: anepisternum; pr: preepisternum); 5, *A. posticalis*, male, Suwon, mesopleura, left side, ventrolateral view; 6, *A. parki*, female, holotype, abdomen, dorsal view; 7, *A. posticalis*, female, lectotype, abdomen, dorsal view; 8, *A. posticalis*, female, Suwon, abdomen, dorsal view.

impunctate, distinctly demarcated dorsally by rather sharply defined facial crest; postgena usually mostly black, with only ventral outer margin pale; pale marking on mesonotal lateral lobe poorly developed, with anterior spot close to middle lobe often absent, and pale spot on mesoscutellum sometimes reduced or absent; mesepisternum pale sordid yellow, with margins and borders between preepisternum and anepisternum black (Fig. 5); hind femur mostly black above. Larva feeding on two-needle pines.

..... *A. posticalis*



Figs 9-11. *Acantholyda parki*, male, paratopotype, genitalia. 9, dorsal view; 10, ventral view; 11, penis valve, lateral view.

REFERENCES

- Berland, L., 1947. Hyménoptères Tenthredoïdes. Faune de France, 47. 496 pp. P. Lechevalier, Paris.
 Christ, J. L., 1791. Naturgeschichte, Klassifikation und Nomenklatur der Insekten, vom Bienen-, Wespen- und

- Ameisengeschlecht. 535 pp., 60 pls. Frankfurt a. Main. (Not seen in original.)
- Chung, S. B. & S. C. Shin, 1985. Studies on the bionomics of the Black-tipped Sawfly, *Acantholyda posticalis posticalis* Matsumura (Hymenoptera: Pamphiliidae). *Res. Rep. For. Res. Inst. Korea*, 32: 31-37. (In Korean with English abstract and summary.)
- Chung, S. B. & S. C. Shin, 1986. Control of the Black-tipped Sawfly, *Acantholyda posticalis posticalis* Matsumura with some insecticides. *Ibid.*, 33: 126-131. (In Korean with English abstract and summary.)
- Chung, S. B. & S. C. Shin, 1994a. Studies on the effects of Black-tipped Sawfly, *Acantholyda posticalis posticalis* Matsumura, on the growth of the Korean White Pine, *Pinus koraiensis* S. et Z. *J. Kor. For. Soc.*, 83: 450-459. (In Korean with English abstract.)
- Chung, S. B. & S. C. Shin, 1994b. Studies on the effects of Black-tipped Sawfly, *Acantholyda posticalis posticalis* Matsumura, on corn formation and corn and seed production of Korean White Pine, *Pinus koraiensis* Siebold et Zuccarini. *Ibid.*, 83: 498-504. (In Korean with English abstract.)
- Enslin, E., 1917. Die Tenthredinoidea Mitteleuropas VII. *Dtsch. ent. Z.*, 1917 (Beiheft): 663-790.
- Fabricius J. C., 1793. *Entomologia Systematica, Emendata et Aucta*. Vol. 2. Hafniae.
- Fourcroy, A. F. de, 1785. *Entomologia Parisiensis*, Vol. 2. Paris. (Not seen in original.)
- Gussakovskij, V. V., 1935. *Chalastogastra* (pt. 1). Faune de l'URSS (n. s. 1), Insectes Hyménoptères, II (1). XVIII+453pp. Édition de l'Académie des Sciences de l'URSS, Moscow, Leningrad. (In Russian with German summary.)
- Härdtl, H., 1943. Über die Lebensweise der *Lyda stellata* als Grundlage einer Bekämpfung. *Z. ang. Ent.*, 30: 163-223.
- Kim, C. W., 1963. Hymenoptera of Korea. *Humanit. Sci. (nat. Sci.) Korea Univ.*, 6: 243-374. (In Korean.)
- Kim, C. W., 1970. Illustrated Encyclopedia of Fauna and Flora of Korea, 11 (3). 891 pp. Samwha-Chulpansa, Seoul. (In Korean.)
- Kim, C. W., J. W. Lee, J. S. Park, B. J. Kim & J. C. Park, 1994. Hymenoptera. In The Entomological Society of Korea and Korean Society of Applied Entomology, *Check List of Insects from Korea*, pp. 216-269. Kon-Kuk University Press, Seoul.
- Klima, A., 1937. Pamphiliidae. Hedicke, H. (ed.), *Hymenopterorum Catalogus*, 3. 84 pp. W. Junk, 's-Gravenhage.
- Ko, J. H., 1969. A List of Forest Insect Pests in Korea. 458 pp. Forest Research Institute, Seoul.
- Koehler, W., 1954. Two forms of the species *Acantholyda nemoralis* Thoms. *Roczn. nauk lesn. Warszawa*, 4: 69-88. (In Polish with Russian and English summaries.)
- Koehler, W., 1957. *Acantholyda nemoralis* Thoms. in the Silesian forests. *Roczn. nauk lesn. Warszawa*, 15: 3-193. (In Polish with Russian and English summaries.)
- Koehler, W., 1962. Über die Ursachen des spezifischen Verlaufes der Massenaufreten von *Acantholyda nemoralis* Thoms. *XI Int. Kongr. f. Ent. Wien*, pp. 255-257.
- Koehler, W., 1964. Osnuje sosnowe. Panstw. Wyd. rol. i. lesne. Warszawa, pp. 1-80. (Not seen in original.)
- Kolomyietz, N. G., 1967. Sawfly Weaver (Distribution, Biology, Damage, Natural Enemies, Control). 136 pp. Nauka, Novosibirsk. (In Russian.)
- Korean Society of Plant Protection, 1972. [List of Plant Diseases, Pests and Weeds of Korea.] 424 pp. Suwon. (In Korean.)
- Lee, D.-S., 1961. Studies on a Korean Unrecorded Pamphilid[sic]-sawfly (Hymenoptera, Symphyta) feeding on Korean Pine. Taxonomical and morphological studies. *Kor. J. Zool.*, 4: 1-6.
- Lee, D.-S., 1962. Studies on a Korean Unrecorded Pamphilid[sic]-sawfly (Hymenoptera, Symphyta) feeding on Korean Pine (II). The life-history. *Ibid.*, 5: 21-29.

- Lee, D.-S., 1963. Studies on a Korean Unrecorded Pamphiliid[sic]-sawfly (Hymenoptera, Symphyta) feeding on Korean Pine (III). The natural enemies. *Ibid.*, 6: 21-24.
- Lee, D.-S. & D. Y. Cho, 1959. Studies on the destructive leaf rolling-sawfly of the Korean pine (Preannouncement). *Bull. For. Exper. Stat., Korea*, (8): 85-110. (In Korean with English summary.)
- Linnaeus, C., 1758. *Systema Naturae, per Regna Tria Naturae Secundum Classes, Ordines, Genera, Species, cum Characteribus, Differentiis, Synonymis, Locis. Regnum Animale*, Ed. 10. Vol. 1. 826pp. Holmiae.
- Matsumura, S., 1912. *Thousand Insects of Japan*, Suppl. IV. 247 pp.+14 pls. Keigakusha, Tokyo. (In Japanese and English.)
- Middlekauff, W., 1958. The North American sawflies of the genera *Acantholyda*, *Cephalcia* and *Neurotoma* (Hymenoptera: Pamphiliidae). *Univ. Calif. Publs. Ent.*, 14: 51-174.
- Okutani, T., 1967. Food plants of Japanese Symphyta (I). *Jap. J. appl. Ent. Zool.*, 11:43-49.
- Paik, U. H., 1960. *New Technic of Agriculture*. 344 pp. (In Korean.) (Not seen in original)
- Roberti, D., 1951. La Lida del pino (*Acantholyda nemoralis* Thomson). *Boll. Lab. Ent. Agr. Portici*, 10: 25-85.
- Saito, K., 1928. [Notes on the pests of Red Pine in Korea.] *J. Chosen nat. Hist. Soc.*, (7): 10-13. (In Japanese.)
- Saito, K., 1931. More important injurious forest insects in Corea. *Bull. Agric. For. Coll. Suigen*, (4): 1-81, 1-11, pls. I-IV. (In Japanese.)
- Saito, K., 1941. Ein dendro-entomologischer Beitrag. *Ibid.*, (6): 1-235. (In Japanese.)
- Shinohara, A., 1995. Notes on a pine web-spinning sawfly *Acantholyda sasakii* (Hymenoptera, Pamphiliidae). *Mem. natn. Sci. Mus., Tokyo*, (28): 165-167.
- Takeuchi, K., 1923. A list of Pamphiliidae of Japan. *Insect World, Gifu*, 27: 362-366. (In Japanese.)
- Takeuchi, K., 1927. Some Chalastogastra from Corea. *Trans. nat. Hist. Soc. Formosa*, 17: 378-387.
- Takeuchi, K., 1930. A revisional list of the Japanese Pamphiliidae, with descriptions of nine new species. *Trans. Kansai ent. Soc.*, 1: 3-16.
- Takeuchi, K., 1938. A systematic study on the Suborder Symphyta of the Japanese Empire (I). *Tenthredo*, 2: 173-229.
- Thomson, C. G., 1871. *Hymenoptera Scandinaviae*, I. *Tenthredo* et *Sirex* Lin. 342 pp. Lundae.
- Xiao, G.-r., X.-y. Huang, S.-z. Zhou, J. Wu, P. Zhang, 1991. *Economic Sawfly Fauna of China* (Hymenoptera, Symphyta). 226 pp. Tianze Eldonejo, Beijing. (In Chinese.)
- Yano, M., 1916. [Scientific names of pine sawflies.] *Insect World, Gifu*, 20: 179-181. (In Japanese.)
- Yano, M. & K. Sato, 1928. Two new species of Chalastogastra (Hymenoptera) from Japan. *Kontyû, Tokyo*, 2: 209-212.

한국産 *Acantholyda*屬 (벌目, 잎벌亞目, 납작잎벌科)의 분류학적 정리

篠原明彦¹, 邊 鳳 奎²

¹國立科學博物館 動物研究部, 東京 169, 日本

²山林廳 林業研究院 山林昆蟲科, 서울 130-012, 韓國

한국産 *Acantholyda*屬은 *A. erythrocephala* (Linnaeus), *A. posticalis* (Matsumura) 및 *A. parki* sp. nov. 등 3종으로 정리된다. 이중 분류상의 어려움이 많아 명명학적으로 혼동이 많았던 이들 종들에 대한 정리가 이루어졌다. 또한 잣나무의 주요해충으로 알려졌던 잣나무넓적잎벌은 현재까지 *A. posticalis posticalis* M.로 기록되어 왔으며 최근에는 *Acantholyda nemoralis* T.로 정리되어 있으나 일본 북해도대학에 소장되어 있는 同種의 모식표본을 검경한 결과 분류학적으로 다른 별도종으로 확인되었을 뿐만 아니라 기주특이성과 생태적으로 차이점을 보여 新種인 *A. parki* sp. nov.으로 記載하였다.

검색어 : 分類, 벌目, 납작잎벌科, *Acantholyda*屬, 新種, 韓國

(Received: 25 July 1996)

(Accepted: 30 August 1996)